

The Future of Graduate Education in The School of Technology

**Dennis R. Depew, Robert J. Herrick
Purdue University**

As we consider the future of technology education, one should ask a basic question: Will tomorrow be different from today? Most will agree that the obvious answer is “yes.” In a day when technology is transforming all aspects of our lives, both at home and at work, it is important that we consider the future of those individuals completing undergraduate degree programs in technology and engineering technology.

As the number of students completing an undergraduate degree in technology related programs continues to increase, the demand for graduate education opportunities for this growing population will continue to increase. Also, as this demand continues to grow, the need for greater flexibility in delivery will also increase. Competition for this potential customer base will encourage higher education to design new and innovative delivery systems to serve the educational needs of these customers.

As technology and engineering technology programs continue to change and evolve in striving to meet society’s technological expectations and needs, it is imperative that graduate education be considered as an important element. A study conducted at Purdue University reported that 92% of the alumni and faculty surveyed indicated that graduate education in technology is important for the professional development of individuals working in industry and that there exists a perceived demand for graduate education in technology and engineering technology (Brauer, August 1993). Although this study surveyed only faculty and alumni of Purdue University, and generalizing these findings to broader level would be inappropriate from a true research point of view, the fact remains that graduate education for technologists is an important issue that must be addressed.

As more individuals graduated from technology-related programs enter the work force, the need for graduate education appropriate for their future professional development will become an important priority in remaining competitive in the international market place. In addition to providing advanced studies for individuals in industry, providing graduate education for the future professors of technology at the two-and four-year college level will also become critical in delivering high-quality education for future generations of technologists.

When one merely considers the number of individuals graduating from technology and engineering technology programs today, the need for graduate programs appropriate for these individuals becomes more evident. At Purdue University, the School of Technology graduates approximately 800 individuals each year with baccalaureate degrees from technology and engineering technology programs. The School currently has over 15,000 alumni in the work

force, with 8,000 alumni graduating in the past 10 years (School of Technology, 1996). According to the Engineering Workforce Commission Report, in the fall of 1995, 289 schools with four-year degree programs in engineering technology reported 17,394 students were in their third year or later of an engineering technology or technology related program. Suffice it to say that a significant number of technology and engineering technology graduates will be entering the work force each year (Engineers, 1996).

Graduate Education in the School of Technology

Building on a tradition of excellence in graduate education at Purdue University, the School of Technology offers graduate instruction leading to the Master of Science degree. The non-thesis directed project master's degree program provides an opportunity for individualized professional development studies in technology, engineering technology, and technology education. The goal of the program is to provide an educational experience which will appropriately prepare an individual for leadership positions in industry and education.

The Doctor of Philosophy and the thesis Master of Science degree programs are administered jointly with the School of Education and provide educational opportunities in adult education, instructional development, curriculum design, and education administration, with a major concentration in technology or technology education.

Graduate students are afforded the opportunity to work and study with School of Technology faculty members who have national and international reputations in technical and manufacturing disciplines, as well as areas of human resources. Many of these faculty members have prominent reputations as authors and scholars; over 70 of their textbooks and laboratory manuals are in print and utilized in technology courses throughout the world.

This exceptional faculty, from the eight academic departments within the School of Technology, teach and conduct applied research in 52 individual laboratories, utilizing equipment valued at over 28 million dollars.

Applied Research Opportunities

Each year faculty members and graduate students conduct nearly one million dollars in applied research projects sponsored by business and industry through the School of Technology Centers for Excellence. These research projects provide many opportunities for graduate students to work with faculty members in their respective fields of specialization. These research projects focus on the solution of problems in the workplace through technology transfer, education and training, and strategies to improve businesses' competitiveness.

The Master of Science Degree

Realizing that each student has different career goals and academic background, the Master of Science program offers maximum flexibility in developing an individualized plan of study to prepare the individual for attaining these career goals. The program requires a minimum of 30 credit hours of course work and a 3-credit-hour directed project. Of the 30 credit hours, each student must complete a 9-credit-hour core requirement. These three courses are TECH 564 Measurement and Evaluation in Industry and Technology, TECH 580 Quality and Productivity in Industry and Technology, and TECH 646 Analysis of Research in Industry and Technology. The remaining 21 credit hours are distributed between the primary area (“major”) of Technology and a related area (“minor”) of the student’s choice. Courses may be drawn from the eight departments within the School of Technology or from other schools at Purdue University. Students often include courses from the Schools of Engineering, Education, and Management.

In addition to the primary area of Technology, students may develop an area of concentration or specialization from one of the academic programs within the school:

- Aviation Technology
- Building Construction Management Technology
- Computer Information Systems
- Computer Integrated Manufacturing Technology
- Electrical Engineering Technology
- Industrial Technology
- Mechanical Engineering Technology
- Organizational Leadership and Supervision
- Technical Graphics

Admission Requirements

Applicants for admission to the Master of Science program are expected to have completed a baccalaureate degree with a grade point average of at least 3.00 on a 4.00 scale, and must submit acceptable scores on the General Test Section of the Graduate Record Examination.

Placement

Graduates from the Master of Science program find employment opportunities in business and industry in fields related to their area of specialization, as well as in consulting. Graduates from the program are employed by many of the Fortune 500 companies, including Arthur Andersen, Ford Motor Company, General Motors, Delco Electronics, Symbol Technologies, Eli Lilly, and Northern Telecom. The graduate faculty also view preparing future faculty members for technology and engineering technology programs at the community college and university levels as an important mission of the Master of Science program. Those pursuing an academic career are currently faculty members in technology departments at Tennessee Technological University, East Tennessee State University, the University of Houston, Georgia Southern University, the

Ohio State University, Western Illinois University, Bemidji State University, Ferris State University, Eastern Michigan University, and Purdue University.

Graduate Assistantships

The School of Technology offers a limited number of graduate research and teaching assistantships each year to qualified candidates. These assistantships provide a unique opportunity for graduate students to work with faculty members in classrooms and laboratories related to their area of specialization.

To assure that recipients of these assistantships progress satisfactorily toward their degree objective, graduate appointments are usually limited to no more than one-half-time (20 hours per week). During the 1996-97 academic year, a one-half-time graduate assistantship provides a stipend of at least \$920 per month and will provide a waiver of tuition and fees, except for \$282 per semester.

The Future of Graduate Education

As we look to the future and consider the need for graduate education opportunities for graduates of technology and engineering technology programs, several issues must be carefully considered and evaluated. One is the question of need for graduate programs in technology and engineering technology. In a time when resources are scarce, should universities continue to support graduate programs in technology, or should universities consider creating new graduate programs to serve this growing population? The authors of this paper, the technology and engineering technology graduate faculty from Purdue University's School of Technology, and the many graduates from our programs, believe the answer is yes.

Some graduates from technology and engineering technology programs will choose to pursue graduate study from a business school, perhaps a Master's in Business Administration. The MBA will be an appropriate choice for some. However, some individuals may be searching for advanced study opportunities in an applied area of technology which may only be available from or appropriately offered by, technology and engineering technology programs. Moreover, others may wish to find a graduate program which offers sufficient flexibility for interdisciplinary experiences in both technical and business fields of study.

With distance learning receiving substantial attention today, the issue of flexibility, in terms of delivery, will become increasingly important. Individuals graduating from technology programs will be searching for advanced study opportunities that can be successfully completed without interrupting their career path with their employer, or lowering their standard of living by exiting the work force to complete a degree.

Advances in electronic communications has improved the opportunity and quality of television courses; the ability to conduct teleconference with two-way audio and video; use of the computer

to conduct library research; and, of course, the immense power of the Internet. Technology and engineering faculty now have the ability to deliver high-quality and very flexible graduate education opportunities for our discipline.

As we look to the future, and with the number of technology and engineering technology graduates continuing to enter the work force, we should consider the need for high-quality graduate education programs appropriate for these individuals. These future programs should address the educational needs and requirements of the individual, as well as the employer, who potentially may be providing the necessary financial support. Just as technology and engineering technology programs are evolving and changing to meet the future needs of business and industry at the baccalaureate level, faculty and administrators are well advised to continue to support the future needs of our post-graduates.

References

1. Brauer, William M., 1993, Unpublished Doctoral Dissertation, School of Technology, Purdue University.
2. Engineers, 1996, Bulletin on Careers in the Profession Report, Vol. 3, No. 1.
3. Alumni Data, School of Technology, Purdue University, West Lafayette, IN, 1996.

Biographical Information

DENNIS R. DEPEW is currently Head of the Department of Industrial Technology, Director of Graduate Studies, and Director of the Midwest Center for Advanced Technology Education for the School of Technology at Purdue University. Professor Depew received his bachelor's and master's degrees from East Tennessee State University and his Ph.D. from Purdue University. He is a member of the American Society for Engineering Education.

ROBERT J. HERRICK is professor and assistant department head of EET at Purdue University. He has received many awards for his outstanding teaching, and is a charter member and executive officer of the Purdue University Teaching Academy. He is an active leader in ASEE and IEEE. He is chair of the FIE Annual Conference Steering Committee, an IEEE Press National Editorial Board member, and editor of "Electronics Technology" series.